



19808 Nordhoff Place • Chatsworth, CA 91311

# BEYOND THE BLACKHOLE



**True Stereoscopic 3-D is finally here!**



# The History and Lore of 3-D

The world of 3-D is not limited to the fabulous visual effects that you've seen while playing *Beyond The Black Hole*. Fascination with three-dimensional vision began thousands of years ago. The path from Euclid's first theories of 3-D vision to today's eye-popping computer games was far from direct. Advancement of the technology and art of 3-D has faltered many times because, it seems, scientific and public interest in things three-dimensional seems to occur in waves. While you won't need to know how 3-D vision works to enjoy playing *Beyond The Black Hole*, we think you'll find our brief history of the discovery, development and commercial exploitation of 3-D phenomenon interesting and informative.

*Viewing the 3-D illustrations:* This booklet is illustrated with true three-dimensional pictures. To correctly view the pictures, first locate the "3-D Reading Glasses" supplied with this package. Hold the glasses up to your face with the red lens covering the left eye, and the blue lens over the right eye. The pictures will jump off the page. If you reverse the lenses, the depth effects will be inverted and the images will appear strangely "inside-out." So remember, RED LENS — LEFT EYE!



## The First Clues

We humans have binocular vision; that is, we see with two eyes. Since our eyes are set slightly apart, each eye sees a minutely dissimilar image of the same scene — a phenomenon called parallax. Fortunately, the brain, using a process called stereopsis, fuses the two images into one three-dimensional image. Sounds pretty simple. But the brain does very much more than just cutting and pasting, it is an active partner in the process of vision. It adds information about what the scene is supposed to be to help form the overall picture we "see."

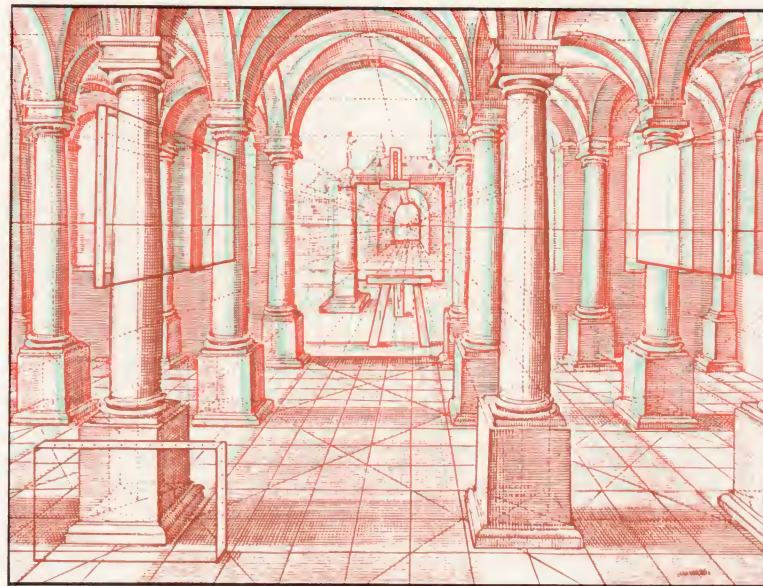


**Binocular Vision**  
(Hypostereo by Tony Anderson)

Try a simple experiment — look at a scene and then close one eye. With one eye closed the brain is only receiving enough information

for a flat, two-dimensional image. Yet you'd swear you are still seeing stereo: objects are still displayed in space, one behind the other. Objects still look rounded and full as opposed to flat. Clearly you're not getting all of that information with just one eye. You're seeing it with both your eye and your brain and your brain is filling in what the eye isn't providing. Seeing, then, is not something done by the eyes alone, but by the eyes together with the brain.

The fact that we have two eyes was, of course, immediately apparent to our most remote ancestors, although the question of "why" we have two eyes was only settled with the Greeks. The famous mathematician Euclid produced a proof which clearly established that a human being's two eyes together see more of an object, such as a sphere, than either one working alone. Euclid, however, was interested in the mathematics of this phenomenon, and not necessarily in the implications it had for humans or any other creature possessing two eyes.



**An Italian Villa**

In the matter of 3-D as in so much else, we owe a great debt to the restless genius of Leonardo da Vinci. At the end of the 16th century, da Vinci wrote a treatise on vision. He concluded that

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